

WHAT IS CLAIMED IS:

1. A method of forming an abrasion-resistant layer on a tip portion of a rotating blade of a machine such as a turbine or jet engine which is arranged near a ring segment fixed to a casing, comprising the steps of:

performing nickel strike plating onto a base material, thereby forming a first plating layer;

performing nickel plating, in which alloy particles containing at least Cr, Al and Y are dispersed, onto the first plating layer, thereby forming a second plating layer;

performing nickel plating, in which alloy particles containing at least Cr, Al and Y and hard particles are dispersed, on the second plating layer, thereby forming a third plating layer;

performing plating, in which alloy particles containing at least Cr, Al and Y are dispersed, onto the third plating layer, thereby forming a fourth plating layer such that the hard particles of the third plating layer are partly exposed; and

performing intermediate heating process to the plating layers to diffuse the alloy particles throughout the plating layers, thereby forming an alloy layer.

2. The method of forming a rotating-blade abrasion-resistant layer according to claim 1, wherein,

after the alloy layer is formed, an Al diffusion process or an Al-Si diffusion process is performed to form an Al or Al-Si diffusion layer on a surface of the alloy layer.

5           3. The method of forming the rotating-blade abrasion-resistant layer according to claim 1, wherein the intermediate heating process is performed at a temperature of 500 to 1100°C for 0.5 to 3 hours in an inert gas atmosphere.

10           4. A rotating-blade abrasion-resistant layer formed on a tip of a rotating blade of a machine such as a turbine or a jet engine, which is arranged near a ring segment fixed on a casing, wherein hard particles are partially exposed, and an alloy layer, in which  
15 alloy particles containing at least Cr, Al and Y are dispersed and diffused, is formed on a base material.

          5. The rotating-blade abrasion-resistant layer according to claim 4, wherein an Al or Al-Si diffusion layer is formed on the surface of the alloy layer such  
20 that the hard particles are partially exposed thereon.

          6. A gas turbine comprising a rotating blade with the rotating-blade abrasion-resistant layer according to claim 4 on the surface thereof, a ring segment fixed to the casing so as to face the rotating blade, and a  
25 stationary blade provided near the casing and between the rotating blade and an adjacent rotating blade.

          7. The gas turbine comprising a rotating blade

with the rotating-blade abrasion-resistant layer according to claim 5 on the surface thereof, a ring segment fixed to the casing so as to face the rotating blade, and a stationary blade provided near the casing and between the rotating blade and an adjacent rotating blade.

8. A method of regenerating a rotating-blade abrasion-resistant layer on a tip portion of a rotating blade of a machine such as a turbine or a jet engine, which is arranged near a ring segment fixed to a casing, the rotating-blade abrasion-resistant layer comprising an alloy layer in which alloy particles containing at least Cr, Al and Y are dispersed and diffused such that the hard particles are partially exposed, wherein, when the alloy layer is ground to the extent that the hard particles fall off along with operation time of the rotating blade, the alloy layer on the base material is entirely removed and thereafter the steps according to claim 1 are performed.

9. A method of regenerating a rotating-blade abrasion-resistant layer on a tip portion of a rotating blade of a machine such as a turbine or a jet engine, which is arranged near a ring segment fixed to a casing, the rotating-blade abrasion-resistant layer comprising an alloy layer in which alloy particles containing at least Cr, Al and Y are dispersed and diffused such that the hard particles are partially

exposed, wherein, when the alloy layer is ground to the extent that the hard particles fall off along with operation time of the rotating blade, the alloy layer on a base material is removed while leaving the part of the alloy layer corresponding to the first plating layer, and thereafter steps on or after the step of forming a second plating layer according to claim 1 are performed.

10. A method of regenerating a rotating-blade abrasion-resistant layer on a tip portion of a rotating blade of a machine such as a turbine or a jet engine, which is arranged near a ring segment fixed to a casing, the rotating-blade abrasion-resistant layer comprising an alloy layer in which alloy particles containing at least Cr, Al and Y are dispersed and diffused such that the hard particles are partially exposed, wherein, when the alloy layer is ground to the extent that the hard particles fall off along with operation time of the rotating blade, the alloy layer on a base material is removed while leaving the part of the alloy layer corresponding to the first and second plating layers, and thereafter steps on or after the step of forming a third plating layer according to claim 1 are performed.